

**Meeting of the Central Valley Flood Protection Board
July 23, 2010**

Staff Report – Encroachment Permit

**A & G Montna Properties, L.P.
Private Boating Facilities, Sutter County**

1.0 – ITEM

Consider approval of Draft Permit No. 18546 (Attachment B)

2.0 – APPLICANT

A & G Montna Properties, L.P.

3.0 – LOCATION

The project is located west of Nicolaus in the Sutter Bypass near Nelson Slough (confluence with Feather River) just south of Sacramento Avenue, and approximately 560 feet west of the left (east) bank levee in Sutter County (Attachments C-1, C-2, C-3). The site is located in the southeastern corner of a recently constructed habitat restoration project (Board Permit No. 18439, April 2009).

4.0 – DESCRIPTION

To construct a private boating facility (Attachment C-4) with paved launch ramp, a floating uncovered boat dock and slips, a floating covered boat dock with mudroom, storage and restroom, a water well and septic system, electrical and propane services, paved parking area, and seasonal equipment storage area. All facilities are for the private use of owners and their guests only.

5.0 – PROJECT ANALYSIS

5.1 – Project History

This application is the third of three components of a large habitat restoration project within the Sutter Bypass. The first component restored approximately 300-acres (see Attachment C-2, North Parcel) upstream of the Feather River under Board Permit No. 18364 approved September 2008. The second component restored approximately 495-acres (see Attachment C-2, South Parcel) downstream of Sacramento Avenue under Board Permit No. 18439 approved April 2009. The proposed boating facilities now under consideration are located at the southeast corner of the South Parcel and supersede a previously withdrawn proposal (originally part of application 18439) to construct a clubhouse at the same location. The proposed boating facilities will not support overnight accommodations (non-habitable).

5.2 – Hydraulic Analysis

A hydraulic analysis using HEC-RAS was performed by MBK Engineers and the results submitted in a report dated March 16, 2009 (Attachment E).

The report evaluated the originally proposed clubhouse. The clubhouse and appurtenances were conservatively simulated by modeling a blocked obstruction 200-feet wide by 100-feet long. The model results determined that the clubhouse would result in no significant hydraulic impacts to the Sacramento River Flood Control Project (Attachment E, highlighted sections on pages 3 – 4).

Since the hydraulic footprint of the boating facilities is not greater than that of the clubhouse Board staff has concluded the boating facilities will also result in no significant hydraulic impacts. For this reason Board staff did not require the applicant to provide a revised analysis specifically for the boating facilities. Staff requested the HEC-RAS data files and forwarded them to the Corps for review.

The floating docks will be securely anchored to pilings. Permit Condition TWENTY-THREE has been included in the draft permit (Attachment B) to require that the top of driven piles shall be set at an elevation equal to the top of levee crown elevation east of and perpendicular to the project site on the left (east) bank levee of the Sutter Bypass. This elevation will be established by the applicant, verified by Board staff and incorporated into the final permit.

5.3 – Geotechnical Analysis

Board staff has concluded that the proposed boating facilities would result in no adverse structural or geotechnical impacts to the Sacramento River Flood Control Project.

5.4 – Additional Staff Analysis

At the applicant's request Board staff agreed to bring this proposal to the Board without the 100 percent plans and specifications. As a result permit conditions TWENTY-SEVEN, TWENTY EIGHT AND TWENTY NINE have been included in the draft permit (Attachment B) to require the applicant to provide 100 percent plans and specifications for Board staff review. Upon review Board staff will modify the permit conditions as necessary to incorporate further technical conditions based on details provided in the final design documents prior to permit issuance.

Recent discussions with the applicant have uncovered the following additional details which will be included in the final 100 percent design package:

- The project will require an extension of nearby electrical service via overhead lines (see point on Attachment C-3, Proposed Site Map)
- Elevations shown on Attachment C-4, Boating Facilities Site Plan are at NAV 88 datum. The conversion from NAV 88 to NGV 29 datum is - 2.356 feet.
- The bottom of the boat marina pond area is 25.0 NAV 88 (22.64 NGV 29).
- The invert of the boat canal is 30.3 NAV 88 (27.96 NGV 29). Grading for the boat canal was approved in the grading plan under Permit 18439.
- The design WSEL is 32.90 NAV 88 (30.54 NGV 29).
- Propane service will be provided by dock-mounted tank.
- The 14 plants shown on Attachment C-4, Boating Facilities Site Plan will be selected in accordance with Title 23.
- All other design details will be provided in the 100 percent design package.

6.0 – AGENCY COMMENTS AND ENDORSEMENTS

The endorsements and comments associated with this project from all pertinent agencies are shown below:

- This application was received prior to January 1, 2010 when endorsement by the Department of Water Resources for proposed projects in areas of the Sacramento River Flood Control Project operated and maintained by the

Department became a Board requirement. Staff has transmitted the application package and this Staff Report to the Superintendent of the Sutter Maintenance Yard and is awaiting a reply. Upon receipt and review of the endorsement by Board staff it will be incorporated into the permit as Exhibit A.

- The U.S. Army Corps of Engineers 208.10 review is ongoing. Upon receipt and review of the Corps comment letter by Board staff it will be incorporated into the permit as Exhibit B.

7.0 – PROPOSED CEQA FINDINGS

Board staff has prepared CEQA findings (see Attachment D) for this project.

8.0 – SECTION 8610.5 CONSIDERATIONS

1. Evidence that the Board admits into its record from any party, State or local public agency, or nongovernmental organization with expertise in flood or flood plain management:

The Board will make its decision based on the evidence in the permit application and attachments, this staff report, and any other evidence presented by any individual or group.

2. The best available science that related to the scientific issues presented by the executive officer, legal counsel, the Department or other parties that raise credible scientific issues.

The accepted industry standards for the work proposed under this permit as regulated by Title 23 have been applied to the review of this permit.

3. Effects of the decision on the entire State Plan of Flood Control:

As described in Section 5.0 through 5.3 above Board staff have concluded that this proposed project will result in no adverse impacts to the State Plan of Flood Control.

4. Effects of reasonable projected future events, including, but not limited to, changes in hydrology, climate, and development within the applicable watershed:

Specific quantified impacts of climate change on future hydrology and floodplain condition in the Sacramento River basin have not been studied by the Board, U.S. Army Corps of Engineers, or other flood management partners.

The Sutter Bypass is above the upstream limit of tidal influence from the Pacific Ocean when flowing.

While future climate change – induced sea level rise could result in increased magnitudes and / or upstream extent of high tidal levels in the Sacramento River, it is unlikely that those impact could impact water surface elevations in the Sutter Bypass during periods of flow.

9.0 – STAFF RECOMMENDATION

Staff recommends that the Board adopt the CEQA findings and approve the permit conditioned upon receipt and incorporation of:

- local maintaining agency endorsement (DWR)
- U.S. Army Corps of Engineers 208.10 comment letter
- 100 percent plans and specifications

Staff further recommends that the Board authorize the Executive Officer to:

- modify the permit conditions accordingly, if necessary after reviewing the above
- issue the permit
- file a Notice of Determination with the State Clearinghouse

10.0 – LIST OF ATTACHMENTS

- A. Resolution (not used for this permit)
- B. Draft Permit
- C. Maps and Site Plans
- D. CEQA Findings
- E. Hydraulic Analysis (MBK Engineers, March 16, 2009)

Report Completed: Eric Butler
Hydraulic Review: Eric Butler, Steve Dawson
Environmental Review: Andrea Mauro

Design Review: Steve Dawson
Geotechnical Review: Eric Butler, Steve Dawson
Final Review: Len Marino

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DRAFT

STATE OF CALIFORNIA
THE RESOURCES AGENCY
THE CENTRAL VALLEY FLOOD PROTECTION BOARD

PERMIT NO. 18546 BD

This Permit is issued to:

A & G Montna Properties, L.P.
12755 Garden Highway
Yuba City, California 95991

To construct a private boating facility with paved launch ramp, floating uncovered dock and slips, floating covered dock with mudroom, storage and restroom, a water well and septic system, electrical and propane services, paved parking area, and seasonal equipment storage area within a previously permitted habitat restoration project in the Sutter Bypass. The project is located west of Nicolaus near Nelson Slough (confluence with Feather River) at 819 Sacramento Avenue, and approximately 560 feet west of the left (east) bank levee of the Sutter Bypass (Section 10, T12N, R3E, MDB&M, Sutter Maintenance Yard, Sutter Bypass, Sutter County).

NOTE: Special Conditions have been incorporated herein which may place limitations on and/or require modification of your proposed project as described above.

(SEAL)

Dated: _____

Executive Officer

GENERAL CONDITIONS:

ONE: This permit is issued under the provisions of Sections 8700 – 8723 of the Water Code.

TWO: Only work described in the subject application is authorized hereby.

THREE: This permit does not grant a right to use or construct works on land owned by the Sacramento and San Joaquin Drainage District or on any other land.

FOUR: The approved work shall be accomplished under the direction and supervision of the State Department of Water Resources, and the permittee shall conform to all requirements of the Department and The Central Valley Flood Protection Board.

FIVE: Unless the work herein contemplated shall have been commenced within one year after issuance of this permit, the Board reserves the right to change any conditions in this permit as may be consistent with current flood control standards and policies of The Central Valley Flood Protection Board.

SIX: This permit shall remain in effect until revoked. In the event any conditions in this permit are not complied with, it may be revoked on 15 days' notice.

SEVEN: It is understood and agreed to by the permittee that the start of any work under this permit shall constitute an acceptance of the conditions in this permit and an agreement to perform work in accordance therewith.

EIGHT: This permit does not establish any precedent with respect to any other application received by The Central Valley Flood Protection Board.

NINE: The permittee shall, when required by law, secure the written order or consent from all other public agencies having jurisdiction.

TEN: The permittee is responsible for all personal liability and property damage which may arise out of failure on the permittee's part to perform the obligations under this permit. If any claim of liability is made against the State of California, or any departments thereof, the United States of America, a local district or other maintaining agencies and the officers, agents or employees thereof, the permittee shall defend and shall hold each of them harmless from each claim.

ELEVEN: The permittee shall exercise reasonable care to operate and maintain any work authorized herein to preclude injury to or damage to any works necessary to any plan of flood control adopted by the Board or the Legislature, or interfere with the successful execution, functioning or operation of any plan of flood control adopted by the Board or the Legislature.

TWELVE: Should any of the work not conform to the conditions of this permit, the permittee, upon order of The Central Valley Flood Protection Board, shall in the manner prescribed by the Board be responsible for the cost and expense to remove, alter, relocate, or reconstruct all or any part of the work herein approved.

SPECIAL CONDITIONS FOR PERMIT NO. 18546 BD

THIRTEEN: All work approved by this permit shall be in accordance with the submitted drawings and specifications except as modified by special permit conditions herein. No further work, other than that approved by this permit, shall be done in the area without prior approval of the Central Valley Flood Protection Board.

FOURTEEN: The permittee shall maintain the permitted encroachment(s) and the project works within the utilized area in the manner required and as requested by the authorized representative of the Department of Water Resources or any other agency responsible for maintenance.

FIFTEEN: The permittee shall contact the Department of Water Resources by telephone, (916) 574-0609, and submit the enclosed postcard to schedule a preconstruction conference. Failure to do so at least 10 working days prior to start of work may result in delay of the project.

SIXTEEN: The Central Valley Flood Protection Board and Department of Water Resources shall not be held liable for any damages to the permitted encroachment(s) resulting from flood fight, operation, maintenance, inspection, or emergency repair.

SEVENTEEN: The permittee may be required, at permittee's cost and expense, to remove, alter, relocate, or reconstruct all or any part of the permitted encroachment(s) if removal, alteration, relocation, or reconstruction is necessary as part of or in conjunction with any present or future flood control plan or project or if damaged by any cause. If the permittee does not comply, the Central Valley Flood Protection Board may remove the encroachment(s) at the permittee's expense.

EIGHTEEN: The permittee should contact the U.S. Army Corps of Engineers, Sacramento District,

Regulatory Branch, 1325 J Street, Sacramento, California 95814, telephone (916) 557-5250, as compliance with Section 10 of the Rivers and Harbors Act and/or Section 404 of the Clean Water Act may be required.

NINETEEN: The permittee shall be responsible for repair of any damages to the Sutter Bypass and other flood control facilities due to construction, operation, or maintenance of the proposed project.

TWENTY: The permittee is responsible for all liability associated with construction, operation, and maintenance of the permitted facilities and shall defend and hold harmless the State of California, or any departments thereof, from any liability or claims of liability associated therewith.

TWENTY-ONE: If the project, or any portion thereof, is to be abandoned in the future, the permittee or successor shall abandon the project under direction of the Central Valley Flood Protection Board and Department of Water Resources, at the permittee's or successor's cost and expense.

TWENTY-TWO: No construction work of any kind shall be done during the flood season from November 1 to April 15 without prior approval of the Central Valley Flood Protection Board.

TWENTY-THREE: The top of driven piles shall be equal in elevation to the crown elevation of the left bank levee of the Sutter Bypass directly east of the project site.

TWENTY-FOUR: The proposed floating facilities including all gangways shall be properly anchored to prevent detachment from the anchoring system during periods of high water.

TWENTY-FIVE: No material stockpiles, temporary buildings, or equipment shall remain in the floodway during the flood season from November 1 to April 15.

TWENTY-SIX: Debris that may accumulate on the permitted encroachment(s) and related facilities shall be cleared off and disposed of outside the floodway after each period of high water.

TWENTY-SEVEN: Detailed plans for piling type and diameter, boat launching ramp, access roads, parking lot, seasonal equipment storage area, open boat dock, covered dock and mud room, gangways, and all vegetation shall be submitted to and approved by the Central Valley Flood Protection Board prior to start of construction.

TWENTY-EIGHT: The permittee shall submit to the Central Valley Flood Protection Board detailed plans indicating the types, location, and method of installing the proposed utility lines and well prior to their installation. The plans shall also indicate the location of any proposed fuel storage tanks, septic tanks, or any other proposed utilities.

TWENTY-NINE: Fencing and gates are not allowed until the permittee has submitted final plans and specifications for review and approval by Board staff.

THIRTY: Objects connected to the dock shall be properly secured to prevent detachment during periods of high water.

THIRTY-ONE: The permittee shall be responsible for removing all boats or other objects moored to the dock upon receiving notification to do so from the Central Valley Flood Protection Board,

Department of Water Resources, or any other federal, State, or local agency having applicable authority.

THIRTY-TWO: Cleared trees and brush shall be completely burned or removed from the floodway, and downed trees or brush shall not remain in the floodway during the flood season from November 1 to April 15.

THIRTY-THREE: The access roads and parking lot shall be surfaced with a minimum of 4 inches of compacted, Class 2, aggregate base (Caltrans Specification 26-1.02A).

THIRTY-FOUR: Aggregate base material shall be compacted to a relative compaction of not less than 95 percent per ASTM Method D1557-91, with a moisture content sufficient to obtain the required compaction.

THIRTY-FIVE: Handrails on access ways shall be removable.

THIRTY-SIX: All debris generated by this project shall be disposed of outside the Sutter Bypass and Sacramento River Flood Control Project.

THIRTY-SEVEN: The Central Valley Flood Protection Board recommends that the applicant coordinate with the Sutter County Office of Emergency Services, Department of Water Resources and other agencies as necessary to develop an appropriate high water monitoring and evacuation plan.

THIRTY-EIGHT: The permittee shall comply with all conditions set forth in the endorsement from the California Department of Water Resources dated _____, which is attached to this permit as Exhibit A and is incorporated by reference.

THIRTY-NINE: The permittee shall comply with all conditions set forth in the letter from the Department of the Army dated _____, which is attached to this permit as Exhibit B and is incorporated by reference.

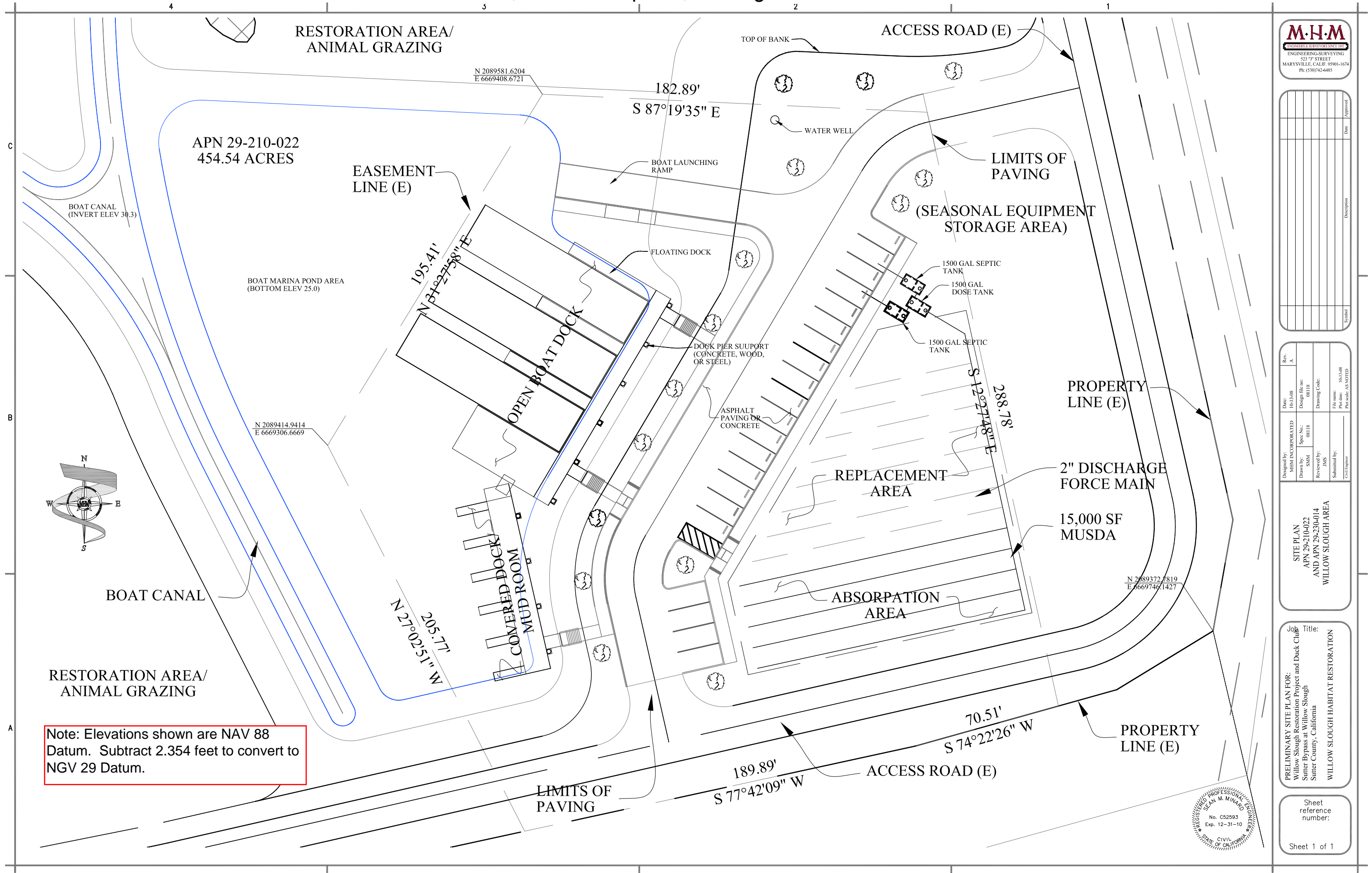
Attachment C-1, Vicinity Map



Attachment C-3, Proposed Site Map



Attachment C-4, Current Proposal, Boating Facilities Site Plan

[illegible]

MMW INCORPORATED	10-11-08	A
Drawn by: Spec No.: SMM 08118	Design file no: 08118	
Reviewed by: JMS	Drawing Code:	
Submitted by:	File name: Plot date: Plot scale: AS NOTED	
Civil Engineer		

APN 29-210-022
AND APN 29-230-014
WILLOW SLOUGH AREA

Job Title: PRELIMINARY SITE PLAN FOR:
Willow Slough Restoration Project and Duck Club
Sutter Bypass at Willow Slough
Sutter County, California
WILLOW SLOUGH HABITAT RESTORATION

Sheet
reference
number:

Sheet 1 of 1

Attachment C-5, Original Proposal - Clubhouse (Superseded by Boating Facilities)

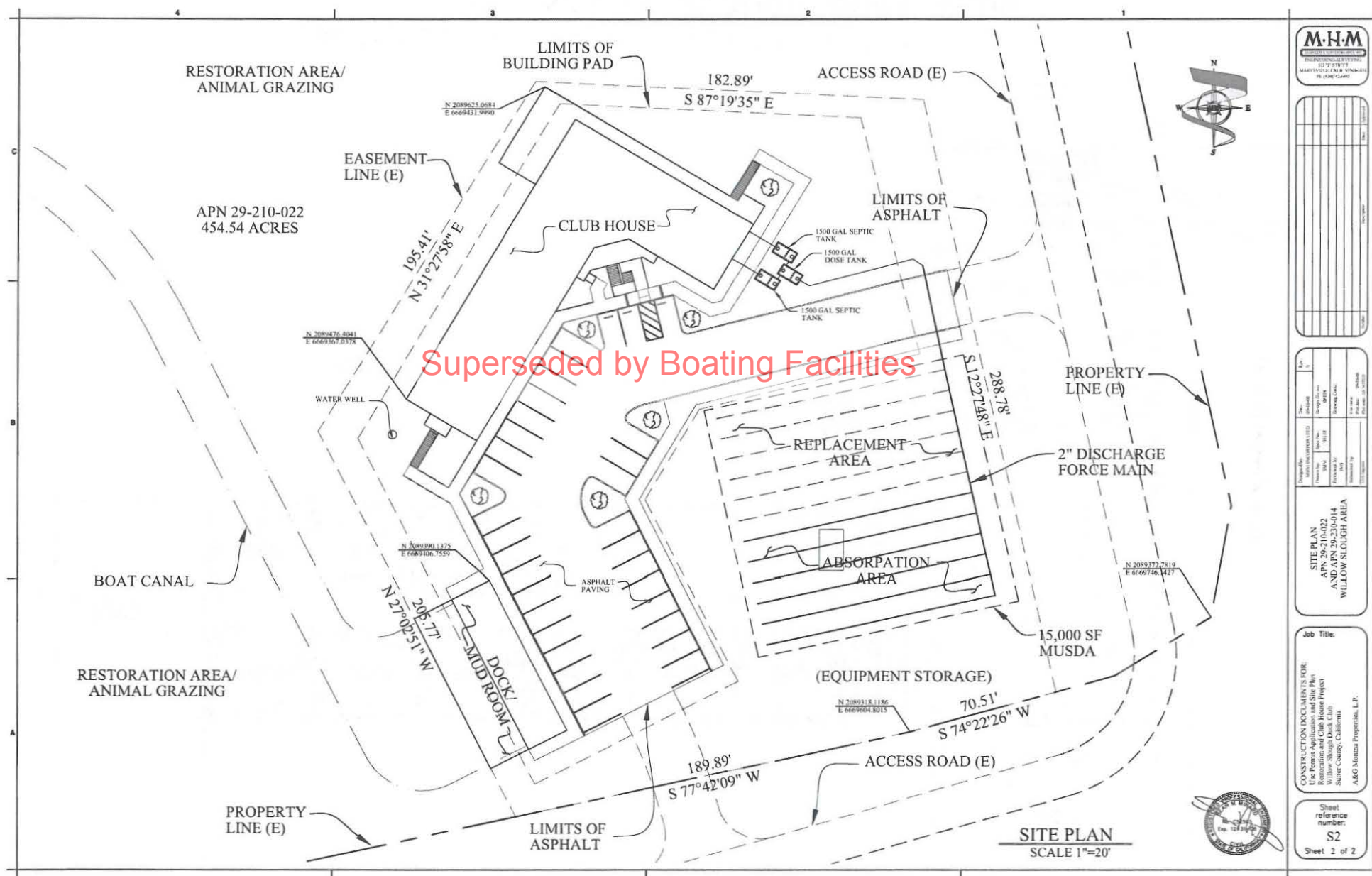


FIGURE 6

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PROPOSED CEQA FINDINGS

Board staff has prepared the following CEQA Findings:

The Board, as a Responsible Agency under CEQA, has reviewed the Initial Study/Mitigated Negative Declaration (IS/MND, SCH Number: 2008122026, December 2008) and Mitigation Monitoring Plan for Project #08-015 (A&G Montana Properties L.P.) prepared by the County of Sutter as the lead agency. The County of Sutter determined that the project would not have a significant effect on the environment and adopted the IS/MND and Mitigation Monitoring Plan at the Sutter County Board of Supervisors Meeting on February 24, 2010. The County of Sutter, as lead agency, filed a Notice of Determination on February 26, 2009. These documents may be viewed or downloaded from the Central Valley Flood Protection Board website at <http://www.cvfpb.ca.gov/meetings/2010/7-22-23-2010agenda.cfm> under a link for this agenda item.

Board staff finds that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. The project proponent has incorporated mandatory mitigation measures into the project plans to avoid identified impacts or to mitigate such impacts to a point where no significant impacts will occur. These mitigation measures are included in the project proponent's Mitigation Reporting Plan and address impacts to air, biological resources, soil resources and hydrology.

Impacts that can be Mitigated

The following are the significant impacts and the mitigation measures to reduce them to less than significant:

- **Air Quality:** The project will not violate any air quality standard or contribute substantially to an existing, or projected, air quality violation because an air quality analysis was completed for the project that determined Feather River Air Quality Management District (FRAQMD) does not require construction emissions be estimated; however, FRAQMD does require standard construction emission mitigation measures and fugitive dust control best available mitigation measures be implemented as part of the project. With the incorporation of the mitigation measures, construction emission impacts will be reduced to a less than significant level. Fugitive dust and emissions during construction will be controlled with best available measures so that the amount of such dust and emissions are reduced.
- **Biological Resources:** The project's potential impacts to species identified as candidate, sensitive, or special status species will be reduced to a less than significant level with the following mitigation measures:

- Construction activities are prohibited within 200 feet from the banks of giant garter snake aquatic habitat and the movement of heavy equipment shall be confined to existing roadways and restricted to occurring between May 1 and October 1.
- Construction personnel shall receive environmental awareness training to recognize giant garter snakes and its habitat. Twenty-four hours prior to construction activities commencing, the project area shall be surveyed by a wildlife biologist for giant garter snakes. If a snake is encountered during construction, activities shall cease until appropriate corrective measures have been completed.
- Any dewatered habitat shall remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling of the dewatered habitat.
- Prior to construction activities commencing in any given year, the applicant shall retain a wildlife biologist to survey the project area for Swainson's hawk. Monitoring of identified nesting sites may be requested by the California Department of Fish and Game. Prior to the commencement of construction activities the property owner/developer shall notify California Department of Fish and Game with written notification of the project under Fish and Game Code Section 1602 (Streambed Alteration Agreements) that applies to perennial, intermittent, and ephemeral rivers, streams and lakes in the State.
- Geology and Soils: The impacts to soils will be reduced to a less than significant level with the implementation of the following mitigation measures:
 - For grading activities of one acre or more, the project proponent will obtain a WDID permit from the State Water Resources Control Board (SWRCB) and have a Stormwater Pollution Prevention Plan (SWPPP) in place. Once approved by Sutter County, the project proponent is to abide by all conditions of the WDID permit and SWPPP.
- Hydrology: The hydraulic impacts will be reduced to a less than significant level with the implementation of the following mitigation measures:
 - A hydraulic analysis demonstrating that all proposed structures have been designed to minimize the probability of hindering flood waters in the Bypass during a flood event; including the incorporation of design features to reduce the potential for capturing or contributing to a buildup of waterborne debris.
 - A floodway analysis that determines the flows related to a one percent annual chance flood, velocities, and the resulting Base Flood Elevations (BFEs) in the project location for all proposed structures. These flood

characteristics shall then be used to demonstrate that proposed structures will not increase the BFE within the floodway. [Reference 44 CFR 60.3(d) (3)]. The analysis shall include not only any proposed building, but all access roads associated with the building. Based upon this analysis, the applicant shall provide certification by a California Registered Civil Engineer that the proposed encroachment within the floodway shall not result in any increase in flood levels during the occurrence of a base flood discharge.

Summary of Findings

Based on its independent review of the IS/MND and Mitigation Monitoring Plan, the Board finds that for each of the significant impacts described above, changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the significant environmental effects as identified in the IS/MND and Mitigation Monitoring Plan. Moreover, such changes or alterations are within the responsibility and jurisdiction of another public agency, the County of Sutter, and such changes have been adopted by that agency.

The documents and other materials which constitute the record of the Central Valley Flood Protection Board's proceedings in this matter are in the custody of Jay Punia, Executive Officer, Central Valley Flood Protection Board, 3310 El Camino Ave., Rm. 151, Sacramento, California 95821.

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MEMORANDUM

DATE: March 16, 2009

TO: A&G Montna Properties

FROM: Don Trieu, P.E.

REVIEWED BY: Mike Archer, P.E.

SUBJECT: Hydraulic Analysis of Mallard Duck and Willow Slough Duck Wetland Restoration Project

Background

A. & G. Montna Properties, L.P. proposes to perform wetlands restoration on two parcels within the Sutter Bypass. The project consists of converting existing agriculture land use to managed wetlands and native grasslands. The north parcel, Mallard Pacific Duck Club, is on the Sutter Bypass approximately four miles upstream of the Feather River and is approximately 300 acres (Figure 1). The south parcel, Willow Slough Duck Club, is located 0.5 miles upstream of the Feather River and is approximately 495 acres (Figure 1). The project also includes construction of a clubhouse and accessory buildings on the southeast corner of the south parcel. A qualitative hydraulic analysis of the project was performed by MBK Engineers in support of the California Central Valley Flood Protection Board (CVFPB) Encroachment Permit Application. The hydraulic analysis was documented in a memo to CVFPB dated July 10, 2008. Subsequent, the Corps of Engineers has requested an analysis using hydraulic modeling software. This memorandum documents the supplemental hydraulic analysis.

Project Description

For the north parcel, the project consists of creating 304 acres of managed wetlands. Ground contouring will be minor and will be balanced cut and fill within the parcel. Unnecessary rice checks and water control structures will be removed and two new rice checks will be constructed. The new rice checks will be parallel to the flood flows and will be approximately 2.5 to 3.0 feet above the existing ground elevation. Fourteen tree mounds will be constructed and planted with Goodings' Willows. The tree mounds will be 2 feet tall with a top dimension of 18 feet by 12 feet with 5H to 1V side slopes. These tree mounds are sparsely spaced around the 304 acre parcel. The top of the new rice checks and tree mounds will not be higher than the existing rice checks. The grading plan for the north parcel is shown in Figure 2.

Work on the south parcel (495 acres) consists of converting the existing agriculture use (rice) to managed wetlands. Existing rice checks and water control structures will be removed as

To: A&G Montna Properties

March 16, 2009

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necessary and one new rice check will be constructed parallel to the flow of the Sutter Bypass. The new rice check will be approximately 12 feet wide and 2.8 feet high above the existing ground. Twenty seven tree mounds will be constructed and planted with Goodings' Willows. The top of the new rice checks and tree mounds will not be higher than the existing rice checks. Figure 3 and 4 show the grading plan for the south parcel.

The project also includes construction of a clubhouse and accessory buildings at the southeast corner of the south parcel (Figure 5). Other accessory buildings and appurtenances include a dock/mud room, a water well, and a septic system (Figure 6). The clubhouse will be 156 feet wide x 96 feet long (Figure 7) with a finish floor elevated 2 feet above the base flood elevation (BFE) and the soffit of the structure above the BFE. (criteria similar to bridges). The clubhouse will be elevated using 24-inch diameter concrete structural columns spaced 17 to 20 feet on center (Figure 8).

Methodology

The methodology used to determine the hydraulic impacts associated with the proposed project was to develop an existing condition model and compare the results with the project condition model. The existing condition assumes the existing channel condition within the Sutter Bypass. The existing condition model was then modified to reflect the proposed project. Output from the model simulations was used to determine if there are any impacts to water surface elevation.

A 1-dimensional HEC-RAS model was used to simulate the existing and project conditions. The hydraulic model used was version 9 of MBK's Feather-Yuba Rivers HEC-RAS model. The model calibration is documented in "*Hydraulic and Hydrologic Documentation for FEMA Certification of Three River's Levee Improvement Authority Project*", March 2007, MBK Engineers.

The HEC-RAS model geometry was modified to reflect the proposed project on the north and south parcel. To simulate the proposed vegetation within the parcels; the Manning's roughness coefficient was modified. On the north parcel, a total of fourteen tree mounds planted with Goodings' Willows are proposed. The total area of vegetation plantings on the north parcel is

$$18 \text{ ft} \times 12 \text{ ft} \times 14 \text{ tree mounds} = 3,024 \text{ sf} = \underline{0.07 \text{ acres}}$$

To simulate the proposed tree mounds, the cross sections (RS 71.05 to 70.12) within the north parcel were modified to reflect the proposed vegetation (Figure 9). A worse case scenario was simulated by modeling the tree mounds as four continuous strips of vegetation running longitudinally along the entire north parcel. The strips of vegetation simulated are approximately 40 feet wide (total width of a tree mound plus side slopes) (Figure 10). A conservative Manning's roughness coefficient of 0.1 was assigned to the vegetation strips. Typically, tall shrubs such as willows would be simulated with a Manning's roughness coefficient of 0.055 to 0.06. The total area of vegetation simulated for the north parcel is

$$40 \text{ ft} \times 4900 \text{ ft} \times 4 \text{ vegetation strips} = 196,000 \text{ sf} = \underline{4.5 \text{ acres}}$$

Figure 11 shows a typical cross section on the north parcel with the vegetation strips.

For the south parcel, twenty seven tree mounds are proposed. The tree mounds were simulated as five 40 feet wide continuous strips of vegetation running longitudinally on the parcel. A Manning's roughness coefficient of 0.1 was assigned to the vegetation strips. The cross sections from RS 67.76 to 67.01 were modified in the model (Figure 9). The total area of vegetation plantings on the south parcel is

$$18 \text{ ft.} \times 12 \text{ ft.} \times 27 \text{ tree mounds} = 5,832 \text{ sf} = \underline{0.13 \text{ acres}}$$

The total area of vegetation simulated on the south parcel is shown below:

$$40 \text{ ft.} \times 3900 \text{ ft.} \times 5 \text{ vegetation strips} = 156,000 \text{ sf} = \underline{3.6 \text{ acres}}$$

A typical cross section for the south parcel is shown in Figure 12.

To simulate the proposed clubhouse on the south parcel, a total of four additional cross sections were placed at the project location. The clubhouse and accessory buildings and appurtenances were simulated in HEC-RAS using a blocked obstruction. Since the clubhouse will be built atop of columns, they have the potential to collect debris and block flow. This worse case scenario was assumed and simulated in the model by blocking out the entire area of the clubhouse and accessory buildings and appurtenances. An area of 200 feet wide by 100 feet long was blocked out in the model cross section to simulate the blockage (Figure 13).

Results

The existing and project condition model were simulated using the 1-in-100 Annual Exceedence Probability (AEP) event. The computed project impacts on the maximum water surface elevation are shown in Tables 1 to 3.

Table 1 – Maximum Water Surface Elevation Impact Along North Parcel (feet-NGVD)

Location	1-in-100 AEP		
	Existing Condition	Project Condition	Difference (ft.)
RS 71.42	46.97	46.98	0.01
RS 71.24	46.92	46.94	0.02
RS 71.05 (upstream end of parcel)	46.88	46.89	0.01
RS 70.86	46.83	46.85	0.02
RS 70.67	46.79	46.80	0.01
RS 70.49	46.75	46.76	0.01
RS 70.3	46.71	46.71	0.00
RS 70.12 (downstream end of parcel)	46.67	46.67	0.00
RS 69.93	46.63	46.63	0.00
RS 69.75	46.58	46.58	0.00

Table 2 – Maximum Water Surface Elevations Along South Parcel

Location	1-in-100 AEP		
	Existing Condition	Project Condition	Difference (ft.)
RS 68.13	46.23	46.23	0.00
RS 67.94	46.19	46.19	0.00
RS 67.76 (upstream end of parcel)	46.15	46.15	0.00
RS 67.57	46.10	46.11	0.01
RS 67.38	46.05	46.06	0.01
RS 67.2	46.00	46.00	0.00
RS 67.01 (downstream end of parcel)	45.94	45.94	0.00
RS 66.86	45.92	45.92	0.00

Table 3 – Maximum Water Surface Elevation Impacts at Clubhouse (feet-NGVD)

Location	1-in-100 AEP		
	Existing Condition	Project Condition	Difference (ft.)
410 feet d/s of clubhouse	45.89	45.89	0.00
10 feet d/s of clubhouse	45.91	45.91	0.00
Downstream side of clubhouse	45.91	45.91	0.00
Upstream side of clubhouse	45.92	45.92	0.00
10 feet u/s of clubhouse	45.92	45.92	0.00
470 feet upstream of clubhouse	45.94	45.94	0.00


Conclusions

Based on simulation results for the 1-in-100 AEP event, there was no measurable change in the maximum water surface upstream and downstream of the proposed project. Conservative assumptions were made on the simulation of the vegetation areas, roughness coefficient, and blocked areas for the clubhouse. Based on the simulations, the proposed project would not have an impact on water surface elevation or the performance of the Sacramento River Flood Control Project in the project area.

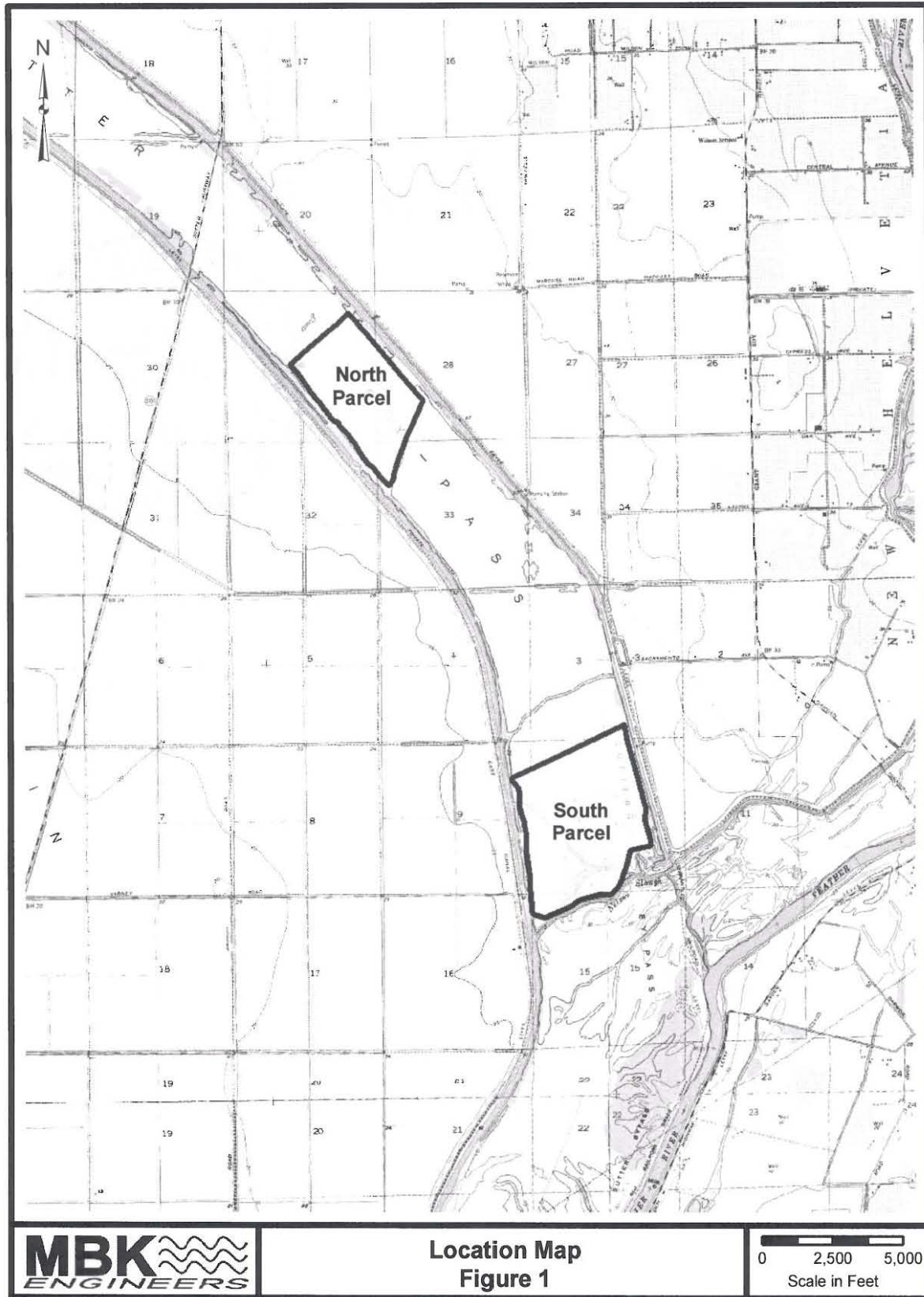
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March 16, 2009

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Don Trieu, P.E.





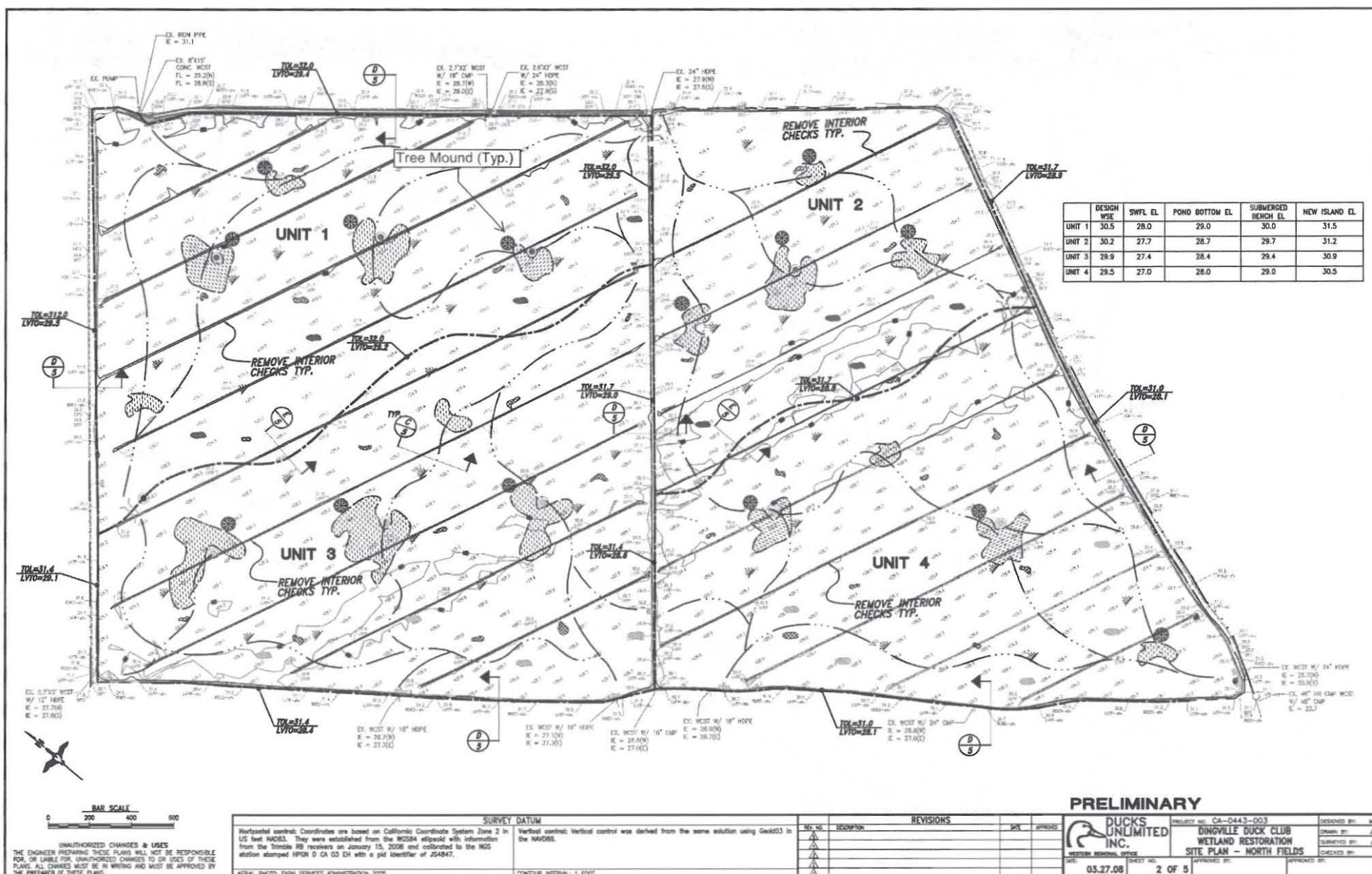


FIGURE 2

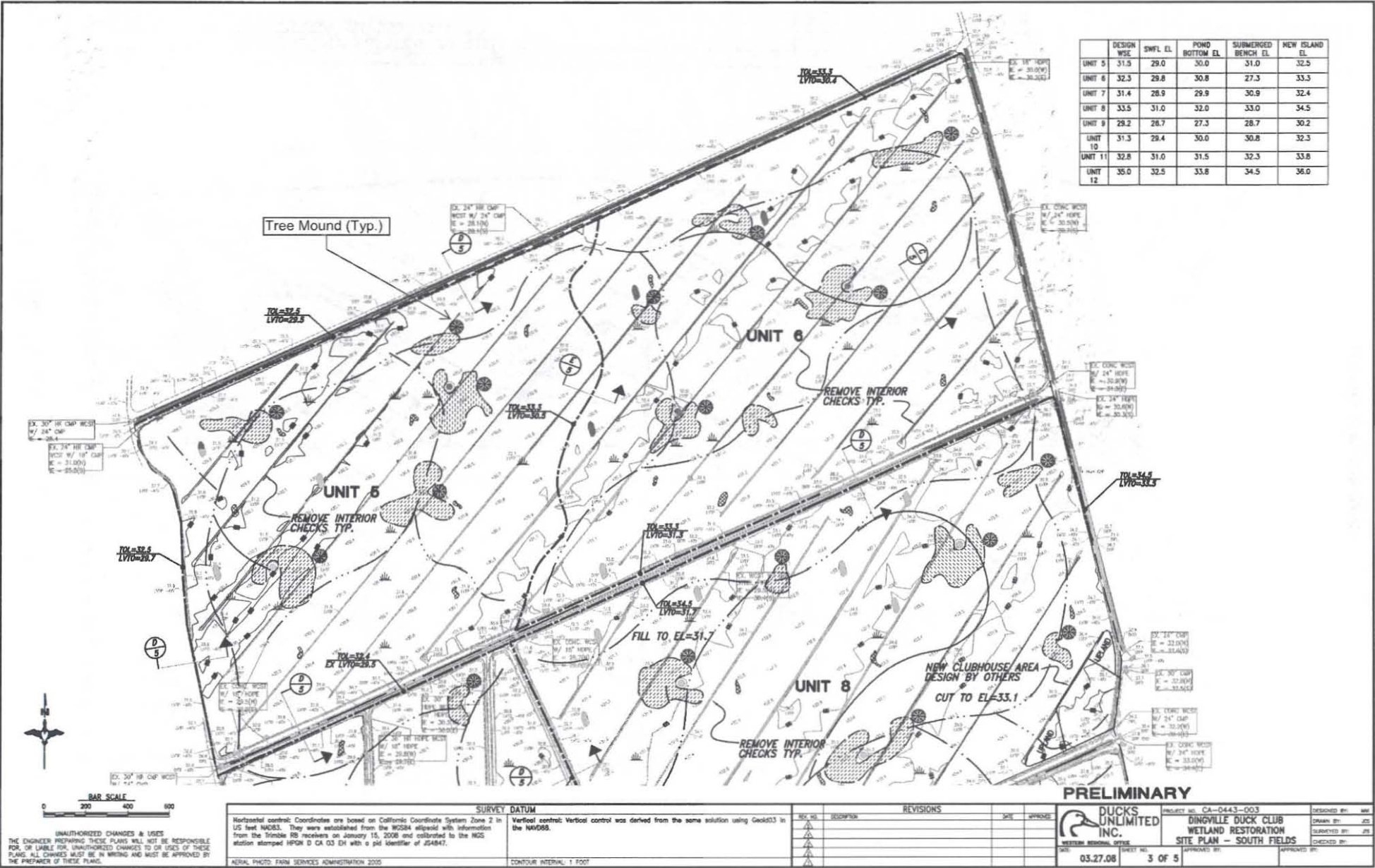


FIGURE 3

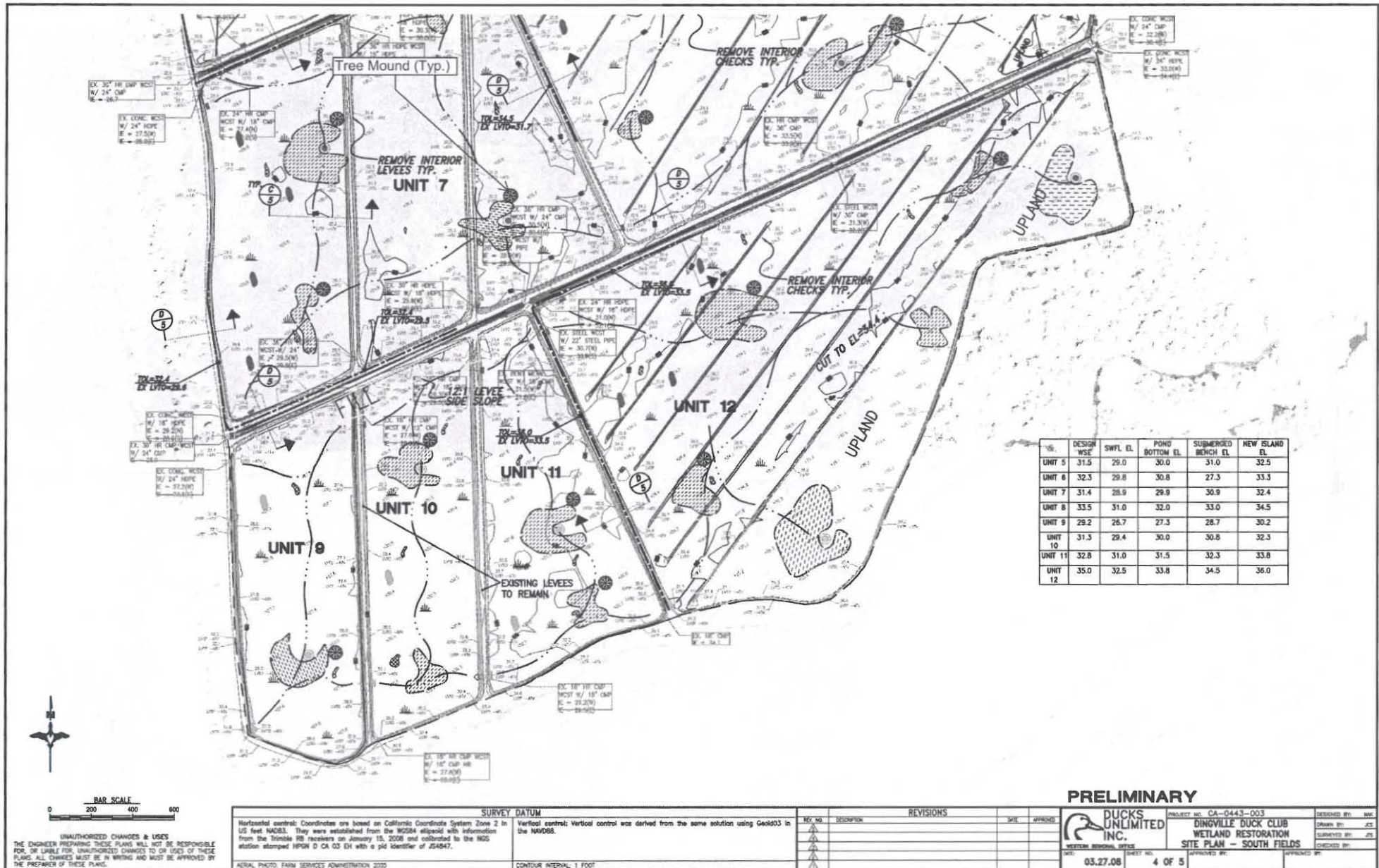


FIGURE 4

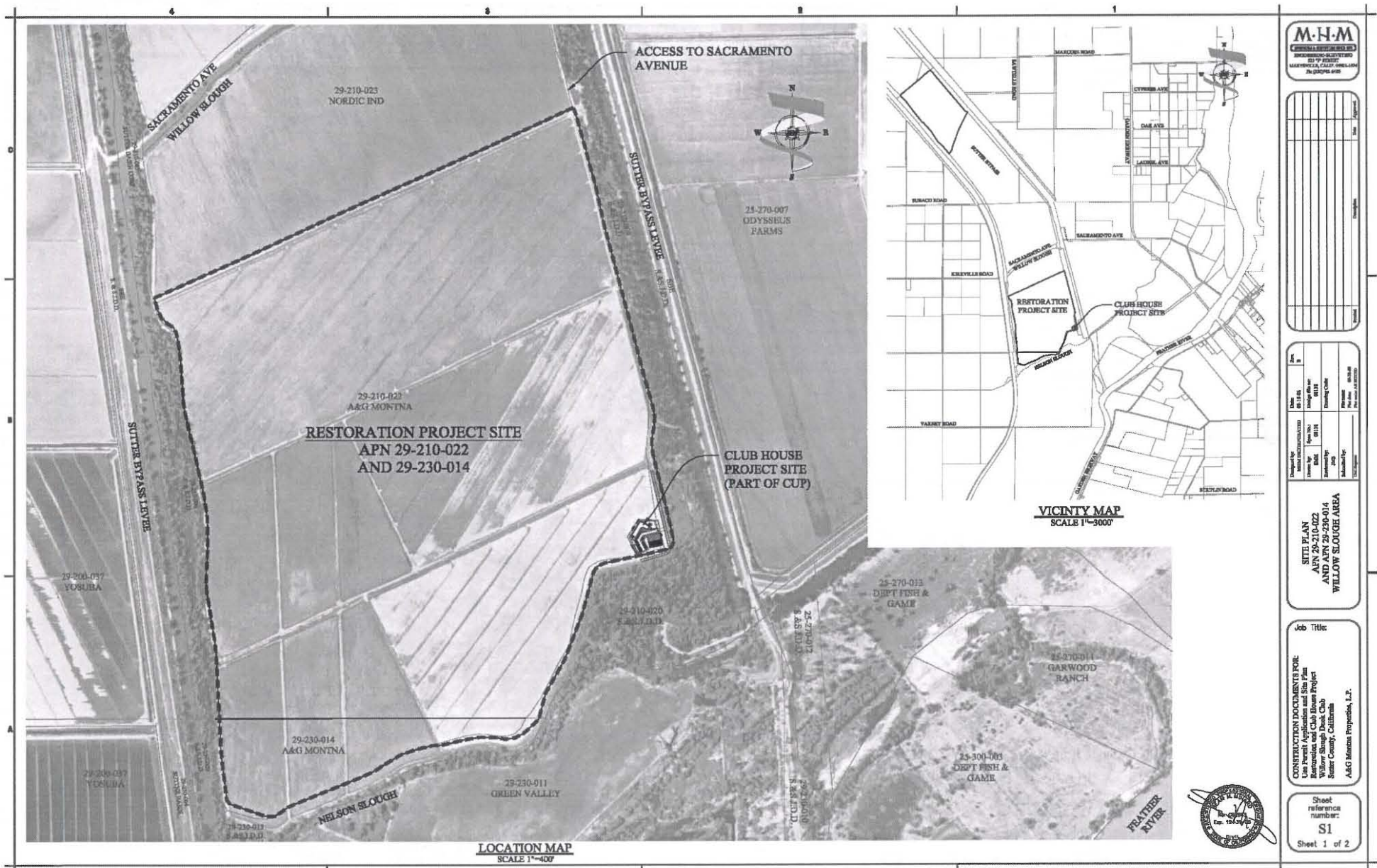
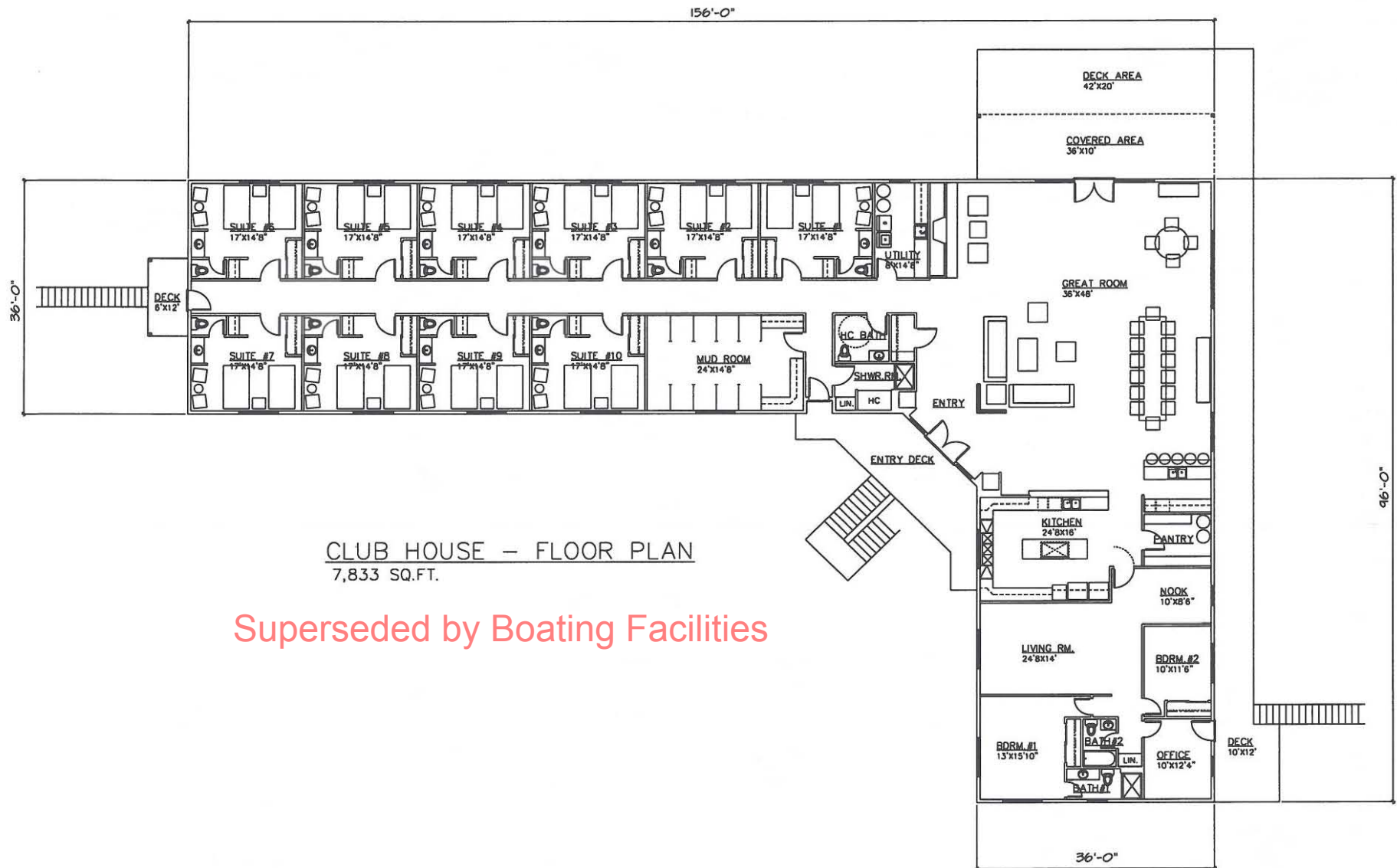


FIGURE 5



FIGURE 6



CLUB HOUSE – FLOOR PLAN
7,833 SQ.FT.

Superseded by Boating Facilities

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PROPOSED BUILDING PLANS FOR:
WILLOW SLOUGH DUCK CLUB
SUTTER COUNTY, CALIFORNIA

FIGURE 7

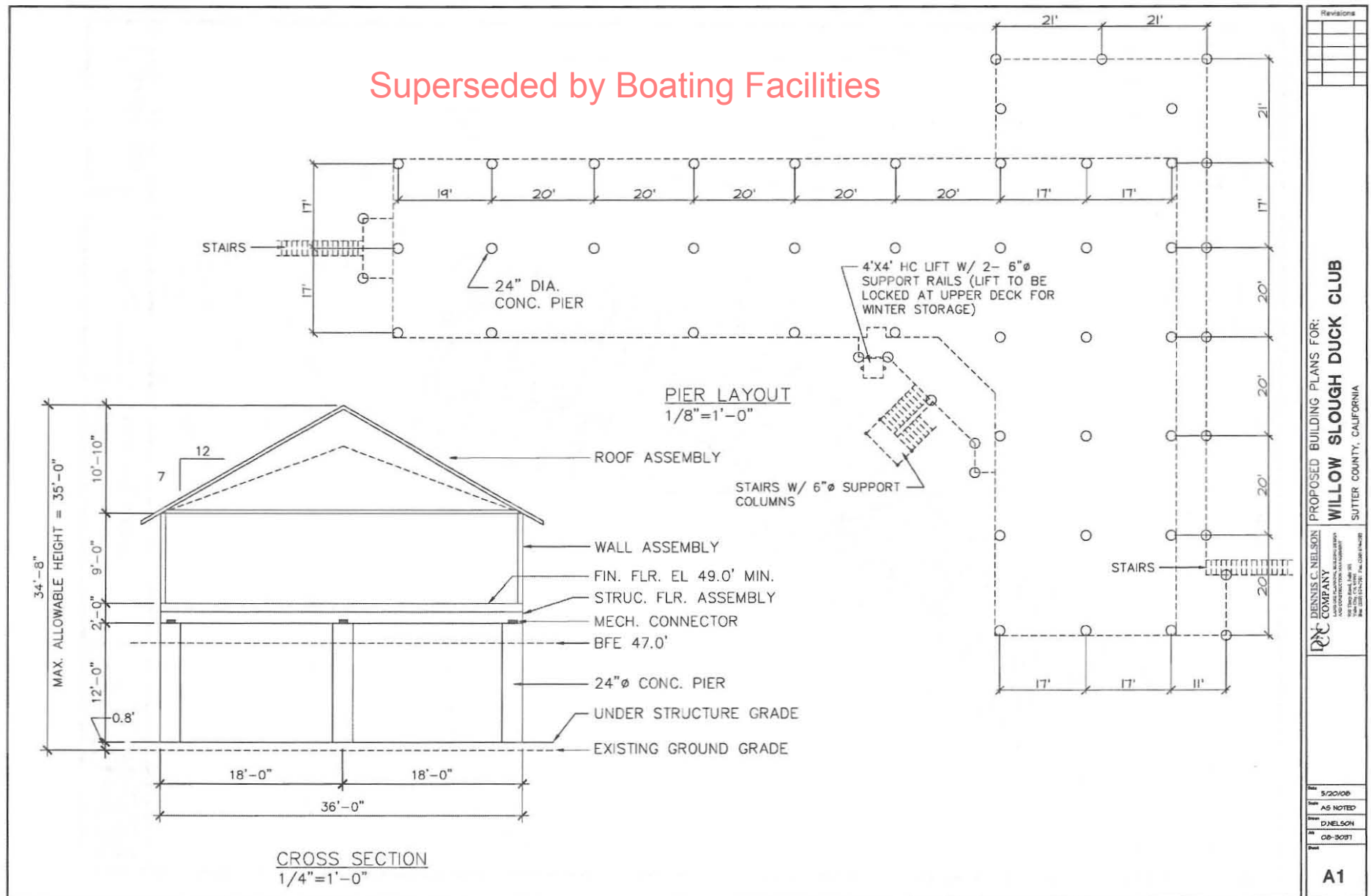
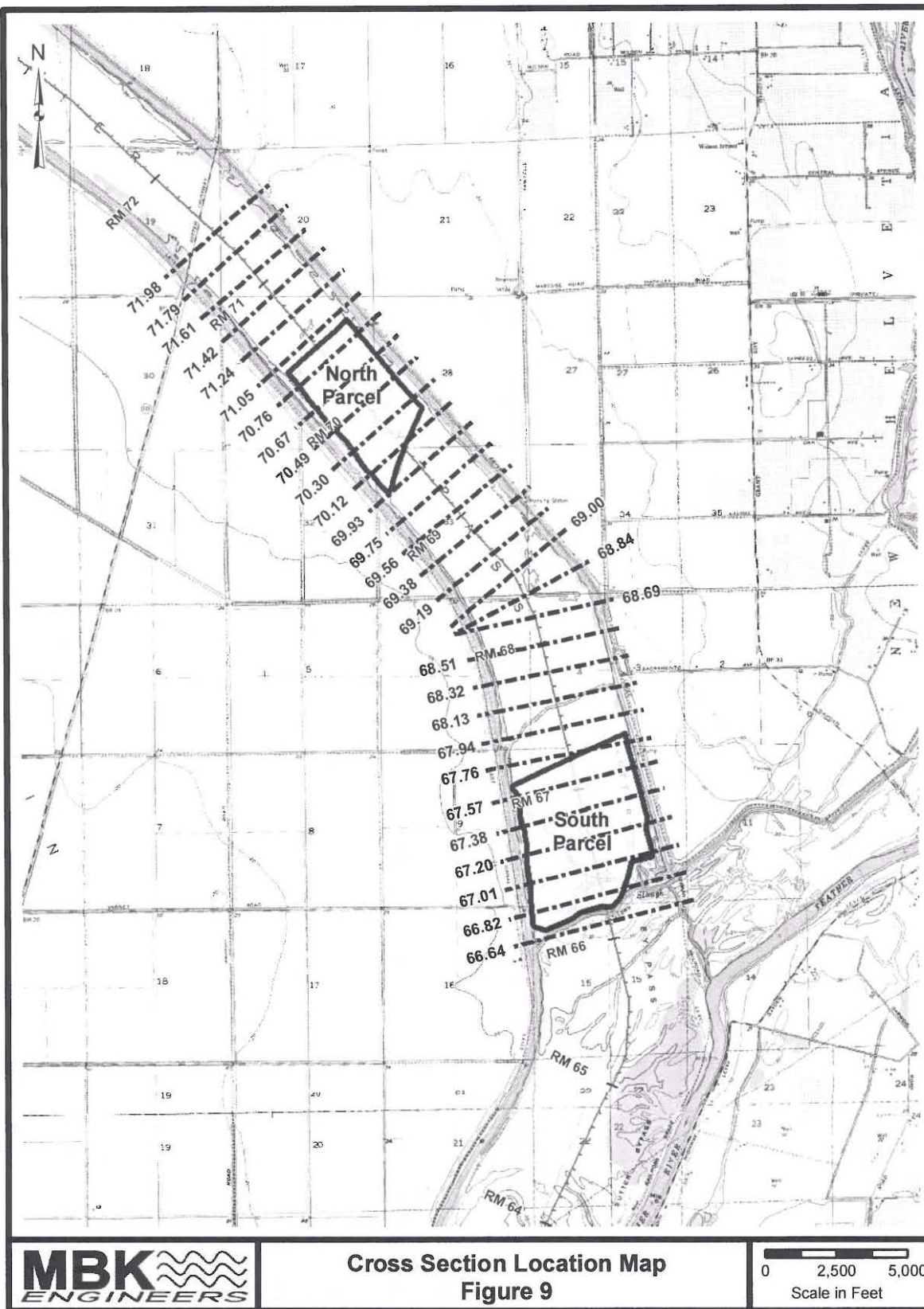


FIGURE 8



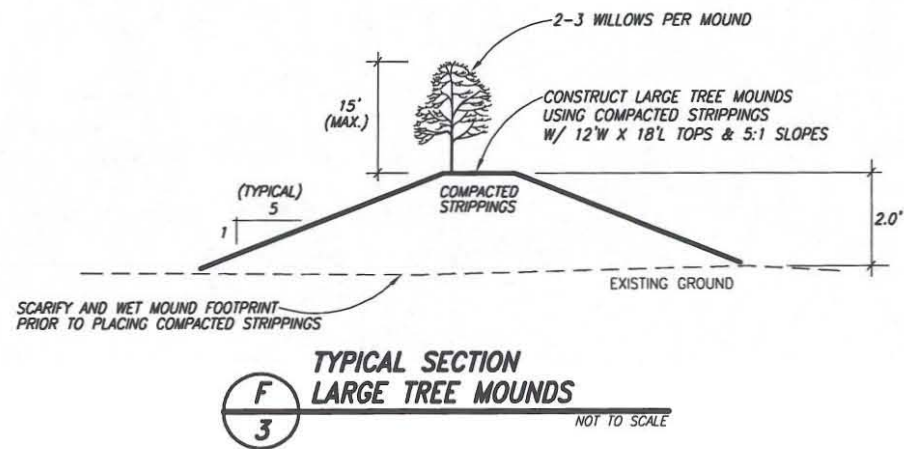


FIGURE 10

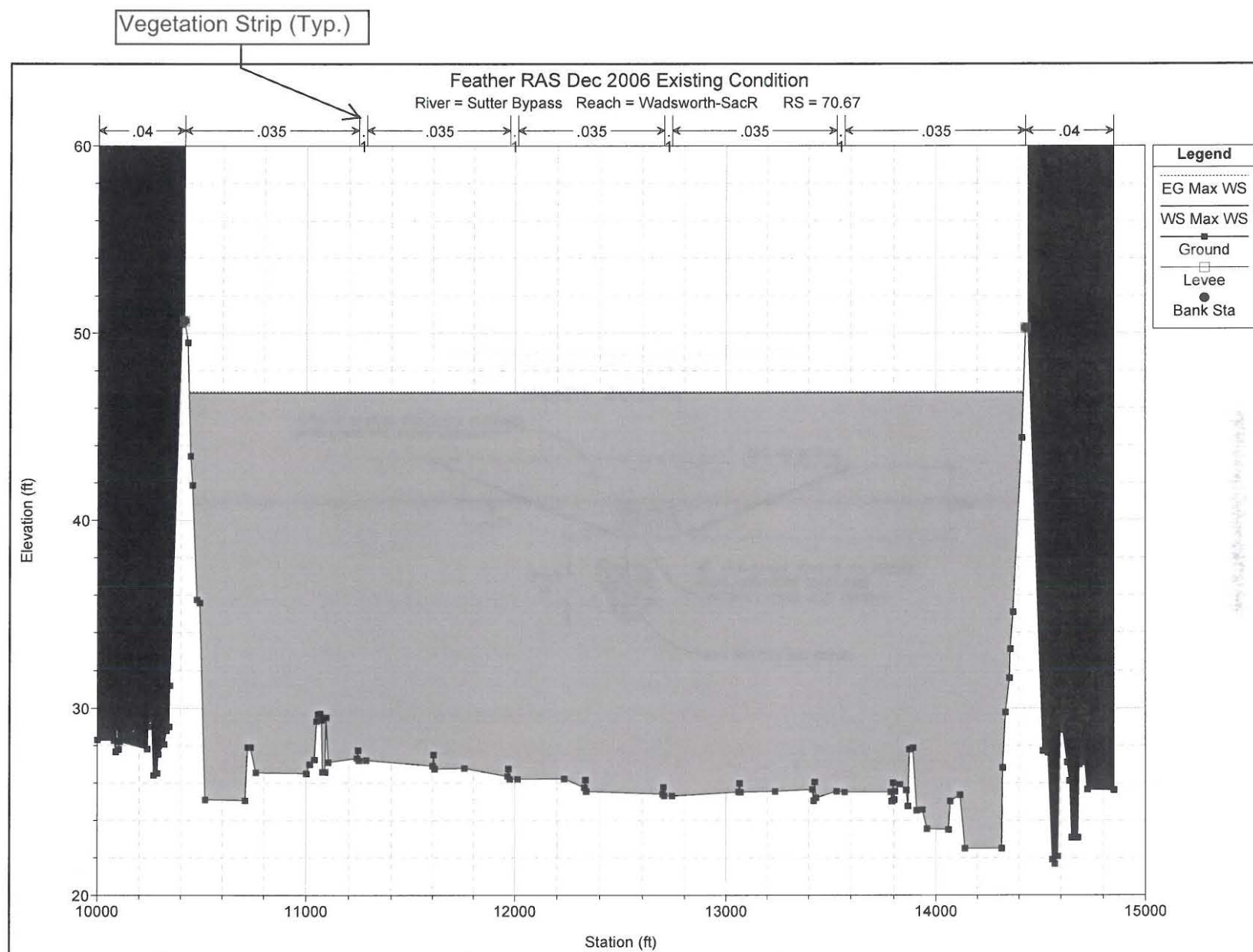


FIGURE 11

